



## Asset management strategies

*Online information systems provide high value - increasing reliability, reducing production support costs, and minimizing safety and environmental risks.*

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**M**anagers in many process industries are in a difficult position. Increased local and global competition requires that they lower production support costs. However, they are also asked to increase throughput and improve yields. In many industries, the task is complicated by new and tougher safety and environmental regulations. Decision-makers in Operations, Maintenance and Reliability struggle to meet these challenges, often while having to rely on fewer people and less expertise.

Improved asset management, especially of the general-purpose machinery directly involved in production, helps solve many of these problems. It increases asset reliability, and reduces maintenance costs and the risk to personal safety and the environment.

### Production optimization

To maintain profitability and stay competitive, many companies have focused on process improvements, since production and process knowledge are at the core of the business. Improved control and process optimization have been very successful in reducing production costs and improving yields. However, some companies believe that process improvements are now at the point of diminishing returns. Many are now targeting other areas of the plant for improvement, such as the assets involved in production.

### Production centered assets

While analyzing process optimization projects, many managers became aware of the potential gains from coordinated management of production, and production assets.

Production assets include the machinery used directly in the manufacture of a product. Common examples are pumps, motors, compressors, fans, turbines, and blowers. However, gearboxes, valves, heat exchangers, piping, wiring, switch gear, and support structures may also be considered production assets. Production assets may require substantial resources to support, and are a plant's highest safety and environmental risks.

In most plants, critical production assets, such as high-speed turbomachinery, are already protected and managed by monitoring and diagnostic systems. However, many general-purpose assets, used directly in manufacturing, aren't. The improved management of these assets, in conjunction with process management, can offer a substantial return on investment.

### Best practice asset management requires online information

Improving asset management depends on actionable information based on the condition of those assets. Actionable information indicates when action is required, and how best to take it. It helps identify and eliminate the fundamental cause of problems, so symptoms are not treated over and over again. Actionable information helps you take the correct actions in a timely manner.

Actionable information is derived from constant, reliable data. The data must be acquired frequently, so problems are detected as they develop. High data resolution (in minutes, rather than weeks) is important in fundamental cause analysis. Data acquisition cannot be inhibited by hazardous conditions and inaccessible areas. The data must always be available, regardless of weather, employee illness and job priorities. Frequently-acquired asset condition information is increasingly important for meeting documentation requirements and for protecting plants from liability.

Data becomes actionable information once it is processed, so only potential problems are brought to your attention. It must be integrated into existing plant information systems, so key people, on or off-site, have access to it. When asset condition data is correlated with process data and presented to operations personnel, it helps solve many problems (see "From the desk of" on page 3). However, it is only possible when the asset condition data has enough resolution for meaningful correlation, and operator feedback.

Online systems are the only data acquisition systems that meet these criteria. An online system acquires, reduces and trends asset data automatically. It can communicate with plant and DCS systems, and transfers data over a network, so actionable information is widely available to plant decision-makers.

Online systems help focus maintenance efforts by automating data collec-

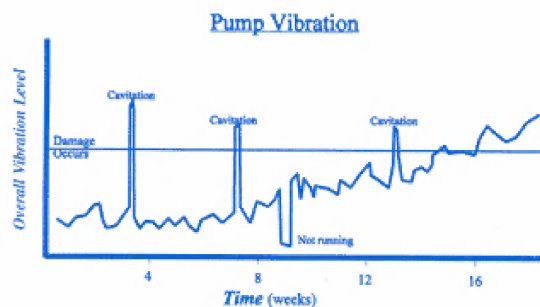


Figure 1

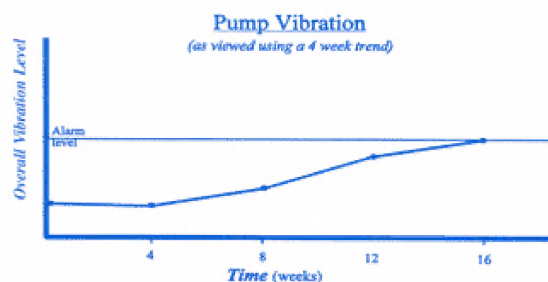


Figure 2

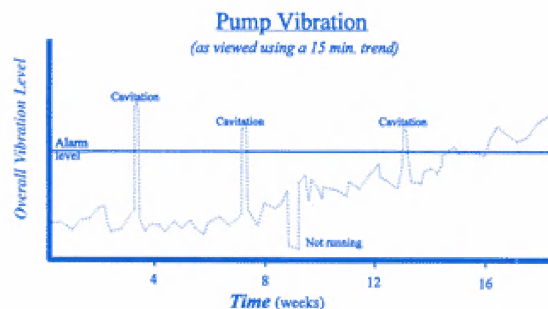


Figure 3

tion and problem identification. These systems also help automate actions when the situation clearly warrants it. Most importantly, fundamental causes of problems are much more likely to be identified when the symptoms are recognized quickly. When provided with adequate feedback, people solve problems very effectively. As one online system user said, "We spend less time detecting, and more time correcting, the fundamental problems."

#### An illustration of value

Figures 1, 2, and 3 illustrate some of the information, and high value, of

trending frequent, reliable data. Figure 1 represents a pump's overall vibration level for a period of approximately 18 weeks. A line is also shown identifying the level where damage occurs. Figure 2 is a trend plot generated using a 4-week sampling period, a common practice when handheld data collection methods are used. Figure 3 is a trend plot with a 15 minute sampling period, which is typical of an online scanning system. Both trends have an alarm point at the vibration level where damage occurs and action is required.

The 4-week interval trend in Figure 2 indicates a developing problem. In Week 16, an alarm will initiate action. Depending on the reliability and timing of each measurement, the point where the condition is identified can vary. Once the alarm suggests a potential problem, it will usually be analyzed in greater detail. If further analysis suggests bearing problems, maintenance can be planned and, in many cases, the problem is assumed to be solved.

The 15-minute interval trend in Figure 3 provides all the same information as Figure 2, plus much more. A quick review of the trend plot clearly shows the pump's degrading condition as well as periods of high vibration and stress caused by cavitation. This cavitation, caused by inadequate Net Positive Suction Head (NPSH), can result from process conditions or clogged screens. The higher resolution trend also shows the period when the pump was not running. This could be compared with Maintenance or Operations records, to determine why it was shut down. Any

conditions that degrade quickly or are transient may be missed entirely by the low resolution trend in Figure 2. When vibration levels are exceeded (Figure 3), Maintenance, Reliability, or Operations personnel can be alerted to the stressful condition before the problem becomes too destructive. To eliminate the fundamental cause, we need information from the higher resolution trend. Without it, we cannot begin to understand the chain of events which shortens the pump's service life.

Another valuable piece of information, clearly indicated with the higher resolution trend in Figure 3, is the ambient vibration level when the pump is not running. Rolling element bearings can be damaged by high ambient vibration levels (false brinelling), a problem most often found on spare equipment awaiting a call to service.

#### Trendmaster® 2000 for Windows

Trendmaster® 2000 for Windows is Bently Nevada's advanced online scanning system. The intrinsically-safe, 4-wire, single-cable design can use existing plant wiring, to reduce installation costs. It is intrinsically safe, so it requires no explosion-proof housings in hazardous areas. It communicates easily over most networks, because the data acquisition software runs under the Microsoft® Windows NT™ operating systems. The configuration and display packages run under Windows NT, Windows 95 or Windows for Workgroups (3.11) operating systems. The system's data can be integrated with other applications using Modbus® and Net DDE protocols. Bently Nevada can provide integration service to assist you in making these connections.

The trending, alarm, and diagnostic tools built into Trendmaster® 2000 for Windows, are easy-to-use, easy to understand and extremely effective. Users spend time correcting problems, not running routes to acquire data.

Please read the following two case histories to see how companies in diverse industries around the world are reaping huge rewards with online management of general-purpose machinery, using Trendmaster® 2000. ■